

Borehole

# 51-06-04

Log Event A

## Borehole Information

Farm : <u>TX</u>	Tank : <u>TX-106</u>	Site Number : <u>299-W15-149</u>
N-Coord : <u>41,726</u>	W-Coord : <u>75,814</u>	TOC Elevation : <u>672.37</u>
Water Level, ft :	Date Drilled : <u>7/31/1971</u>	

## Casing Record

Type : <u>Steel-welded</u>	Thickness : <u>0.280</u>	ID, in. : <u>6</u>
Top Depth, ft. : <u>0</u>	Bottom Depth, ft. : <u>100</u>	

## Borehole Notes:

The drilling of this borehole was initiated in June 1971 with a 4-ft length of surface casing of unknown diameter. The borehole was driven to a depth of 100.5 ft using 6-in. casing and completed to a nominal total depth of 100 ft. The drilling log does not mention if the casing was perforated or grouted. Total logging depth achieved by the SGLS was 100.5 ft.

The casing thickness is presumed to be 0.280 in., on the basis of published thickness for schedule-40, 6-in. steel tubing.

The zero reference for the SGLS logs is the top of the borehole casing. The top of the casing is approximately 6 in. below the ground surface and is located at the base of a berm that covers a north-south-trending transfer line.

## Equipment Information

Logging System : <u>1</u>	Detector Type : <u>HPGe</u>	Detector Efficiency: <u>35.0 %</u>
Calibration Date : <u>11/1995</u>	Calibration Reference : <u>GJPO-HAN-3</u>	Logging Procedure : <u>P-GJPO-1783</u>

## Log Run Information

Log Run Number : <u>1</u>	Log Run Date : <u>2/6/1996</u>	Logging Engineer: <u>Bob Spatz</u>
Start Depth, ft.: <u>100.5</u>	Counting Time, sec.: <u>100</u>	L/R : <u>L</u> Shield : <u>N</u>
Finish Depth, ft. : <u>50.0</u>	MSA Interval, ft. : <u>0.5</u>	Log Speed, ft/min.: <u>n/a</u>

Log Run Number : <u>2</u>	Log Run Date : <u>2/7/1996</u>	Logging Engineer: <u>Bob Spatz</u>
Start Depth, ft.: <u>51.0</u>	Counting Time, sec.: <u>100</u>	L/R : <u>L</u> Shield : <u>N</u>
Finish Depth, ft. : <u>0.0</u>	MSA Interval, ft. : <u>0.5</u>	Log Speed, ft/min.: <u>n/a</u>

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**Analysis Information**

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Analyst : H.D. Mac LeanData Processing Reference : P-GJPO-1787Analysis Date : 12/4/1996**Analysis Notes :**

This borehole was logged by the SGLS in two logging runs. The pre- and post-survey field verification spectra for both logging runs met the acceptance criteria established for the peak shape and system efficiency, indicating that the logging system was operating within specifications. The energy calibration and peak-shape calibration from accepted field verification spectra were used to establish the channel-to-energy parameters used in processing the spectra acquired during logging. There was negligible gain drift during logging; it was not necessary to adjust the energy calibration to maintain proper peak identification while processing the data from the logging spectra.

Casing correction factors for a 0.280-in.-thick steel casing were applied during analysis.

A depth overlap, where data were collected by separate runs at the same depth, occurred in this borehole between depths of 50 and 51 ft. The concentrations of the K-40 and Th-232 were calculated using the separate data sets at the overlapping depth points. The calculated concentrations of these radionuclides were within the statistical uncertainty of the measurements, indicating very good repeatability of results from the logging activity. The difference in the measured concentration of U-238 using the separate data sets at one of the overlapping points exceeded the statistical uncertainty of the measurements. However, the U-238 determination is based on the presumption that the Bi-214 in the vicinity of the borehole is in secular equilibrium with U-238. One member of the U-238 decay chain is the gas Rn-222. The concentration of this gas does not necessarily remain constant in the borehole between logging runs.

Cs-137 was the only man-made gamma-ray-emitting radionuclide encountered in this borehole. Cs-137 contamination was detected almost continuously from the ground surface to a depth of 19 ft. Detectable quantities of the contaminant were also encountered at depths of 20 ft, between 24 and 25.5 ft, at 26.5, 29, and 32 ft, and at the bottom of the borehole. Zones of relatively higher Cs-137 contamination of about 1 pCi/g were detected from 4.5 to 5.5 ft and at 13 ft. The highest measured Cs-137 concentration was about 15 pCi/g at the ground surface. Except for the bottom 1 ft of the borehole, measured concentrations below the 20-ft depth ranged from 0.2 to 0.3 pCi/g. The measured concentration at the bottom of the borehole was about 1 pCi/g.

The logs of the naturally occurring radionuclides show an increase in the KUT concentrations at a depth of about 51 ft.

The SGLS total count rate is reflective of the man-made radionuclides where present, and the naturally occurring radionuclides elsewhere. There is a pronounced increase in the SGLS total count rate below a depth of about 51 ft. There is a noticeable decrease in the count rate between depths of 82 and 97 ft, with a slight peak in activity at a depth of about 87 ft. A slight increase in the SGLS total count-rate activity occurs at the bottom of the borehole.

Details regarding the interpretation of the data for this borehole are presented in the Tank Summary Data Report for tank TX-106.



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**Log Plot Notes:**

Separate log plots show the man-made (Cs-137) and naturally occurring (KUT) radionuclides. The natural radionuclides can be used for lithology interpretations. The headings of the plots identify the specific gamma rays used to calculate the concentrations.

Uncertainty bars on the plots show the statistical uncertainties for the measurements as 95-percent confidence intervals. Open circles on the plots give the MDL. The MDL of a radionuclide represents the lowest concentration at which positive identification of a gamma-ray peak is statistically defensible.

A combination plot includes the man-made and natural radionuclides, in addition to the total gamma derived from the spectral data and the Tank Farm gross gamma log. The gross gamma plot displays the latest available digital data. No attempt has been made to adjust the depths of the gross gamma logs to coincide with the SGLS data.